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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/006,419	12/07/2001	Oswin Ottinger	SGL 00/9	2778

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EXAMINER
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FEELY, MICHAEL J

ART UNIT	PAPER NUMBER
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1712

DATE MAILED: 10/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/006,419

Applicant(s)

OTTINGER ET AL.

Examiner

Michael J. Feely

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on 15 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10, 18 and 30 is/are allowed.
- 6) ☒ Claim(s) 1-9, 11-16, 19-29 and 31-35 is/are rejected.
- 7) ☒ Claim(s) 17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Previous Objection to the Specification***

1. The objection to the disclosure has been withdrawn.

### ***Previous Claim Objections***

2. The objection to claims 17-24 and 28-30 has been overcome by amendment.
3. The objection to claims 1-13 and 31-33 has been overcome by amendment.

### ***Previous Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. The rejection of claims 1-33 under 35 U.S.C. 112, second paragraph, has been overcome by amendment.

### ***Previous Claim Rejections - 35 USC § 102***

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
7. The rejection of claims 1-6, 13-16, 22-24, and 31-33 under 35 U.S.C. 102(e) as being anticipated by Woods (US Pat. No. 6,656,580) and Technical Data Sheets for Resinol 90C and Resinol RTC, provided by Loctite, stands.
8. The rejection of claims 11, 12, and 19-21 under 35 U.S.C. 102(e) as being anticipated by Woods (US Pat. No. 6,656,580) and Technical Data Sheets for Resinol 90C and Resinol RTC, provided by Loctite, has been overcome by amendment.

Normally, only one reference is used for a rejection under 35 U.S.C. 102; however, the use of multiple references is proper when the extra references are cited to:

A) Prove the primary reference contains "enabled disclosure;" B) Explain the meaning of

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a term used in the primary reference; or C) Show that a characteristic not disclosed in the reference is inherent. In the instant case, Technical Data sheet are used to show inherent characteristics of the acrylic resin used in Woods.

Regarding claims 1-6 and 11-13, Woods (*with support of the Technical Data Sheets*) discloses, *(1)* A synthetic resin-impregnated body (column 4, lines 40-47) comprising a primary product formed of expanded or at least partially recompressed expanded graphite having a liquid-accessible pore system (column 4, line 50 through column 5, line 5), wherein said primary product is impregnated (column 5, lines 20-35) with at least one of: at least one solvent-free polymerizable acrylic resin system; and polymers obtained by curing said at least one resin system (column 5, lines 5-10; Technical Data Sheets for Resinol 90C and Resinol RTC);

*(2)* wherein said at least one acrylic resin system contains triethyleneglycol dimethacrylate (column 9, lines 45-56) and at least one initiator system (column 10, lines 13-27); *(3)* wherein said at least one acrylic resin system contains azo initiators as said at least one initiator (column 10, lines 49-67); *(4)* wherein said azo initiators contained in at least one acrylic resins systems are selected from the group consisting of 2,2'-dimethyl-2,2'-asodipropiononitrile, 1,1'-azobis(1-cyclohexanecarbonitrile) and azoisobutyric acid nitrile (column 10, lines 49-67);

*(5)* wherein said at least one acrylic resin system has a storage stability at room temperature of more than two days (column 5, lines 5-10; Technical Data Sheets for Resinol 90C);

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(6) herein said at least one acrylic resin system has a storage stability at room temperature of more than two weeks (column 5, lines 5-10; Technical Data Sheets for Resinol 90C); and

(13) wherein a continuous resin surface film is not present and the body is electrically conductive (column 6, lines 50-59; column 4, lines 11-16).

Regarding claims 31-33, Woods (*with support of the Technical Data Sheets*) discloses, (31) a sealing element (column 4, lines 11-17), (32) a fuel cell component (column 4, lines 11-17), and (33) a heat conducting element (column 4, lines 11-17) comprising a synthetic resin-impregnated body (column 4, lines 40-47) comprising a primary product formed of expanded or at least partially recompressed expanded graphite having a liquid-accessible pore system (column 4, line 50 through column 5, line 5), wherein said primary product is impregnated (column 5, lines 20-35) with at least one of: at least one solvent-free polymerizable acrylic resin system; and polymers obtained by curing said at least one resin system (column 5, lines 5-10; Technical Data Sheets for Resinol 90C and Resinol RTC).

Regarding claims 14-16 and 22-24, Woods (*with support of the Technical Data Sheets*) discloses (14) a process for producing a resin-impregnated body (column 5, lines 20-36), which comprises: providing a primary product formed of expanded or at least partially recompressed expanded graphite having a liquid-accessible pore system (column 4, line 50 through column 5, line 5); impregnating the primary product with at least one solvent-free polymerizable acrylic resin system to form a resin-containing, uncured intermediate product (column 5, lines 5-10; Technical Data Sheets for Resinol 90C and

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Resinol RTC); and finally subjecting the intermediate product to a curing treatment (column 10, lines 36-49);

(15) which further comprises processing the resin-containing, uncured intermediate product to form a shaped body (column 5, lines 30-36); and carrying out the subjecting step by subjecting the uncured shaped body produced from the uncured intermediate product to a curing treatment for the at least one resin system (column 10, lines 36-49); (16) which further comprises simultaneously shaping the acrylic resin-containing body (column 5, lines 30-55) and curing the resin system that is present as a result of temperature impact (column 10, lines 36-49);

(22) wherein the acrylic resin has a viscosity at room temperature of less than 100 mPa\*s (column 5, lines 5-10; Technical Data Sheets for Resinol 90C);

(23) wherein the acrylic resin has a viscosity at room temperature of less than 50 mPa\*s (column 5, lines 5-10; Technical Data Sheets for Resinol 90C); and

(24) wherein the acrylic resin has a viscosity at room temperature of less than 20 mPa\*s (column 5, lines 5-10; Technical Data Sheets for Resinol 90C).

In the above rejections, the impregnated carbon body would have been inherently thermally and electrically conductive due to the inherent conductive nature of the graphite material. In addition, the acrylic resins would have been inherently “solvent-free” because the Technical Data Sheets provide no detail regarding a solvent presence or content.

***Previous Claim Rejections - 35 USC § 103***

9. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

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10. Claims 7-9 and 25-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woods (US Pat. No. 6,656,580) and Technical Data Sheets for Resinol 90C and Resinol RTC, provided by Loctite.

Regarding claims 7-9 and 25-27, Woods is silent regarding providing specific “take-up” values of (7 & 25) up to 100% (up to 50 wt% acrylic), (8 & 26) 5-35% (5 to 25 wt% acrylic), and (9 & 27) 10-25% (10 to 20 wt% acrylic). However, he discloses, “the amount of sealant up-take can be controlled over a wide range by varying the impregnation pressure, temperature, sealant viscosity, impregnation time or density of the sheet,” (column 6, lines 33-36). Applicant fails to show criticality for this range, and this range is result effective because it has a direct impact on the process-ability and shaping capability of the impregnated sheet. In light of Woods’ teaching, it would have been obvious to one skilled in the art to tailor the “up-take” value by choosing the appropriate processing and material parameters.

Furthermore, it has been found that, “where general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation,” –*In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Therefore it would have been obvious to provide the specific “take-up” values of up to 100% (up to 50 wt% acrylic), 5-35% (5 to 25 wt% acrylic), and 10-25% (10 to 20 wt% acrylic) in the impregnated body of Woods because Woods discloses that the “take up” can be tailored by numerous process and material parameters, resulting in desirable process-ability and shaping capability of the impregnated body.

Regarding claims 28-29, Woods fails to explicitly disclose the curing conditions set forth in claims 28-29. However, Applicant fails to show criticality for these curing

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conditions, and these conditions are result effective variables, necessary to achieve a successful curing reaction.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the curing conditions of less than 10 minutes or less than 3 minutes at a temperature of up to 200°C in order to achieve a successful curing reaction.

***New Claim Rejections - 35 USC § 102***

11. Claim 35 is rejected under 35 U.S.C. 102(e) as being anticipated by Woods (US Pat. No. 6,656,580) and Technical Data Sheets for Resinol 90C and Resinol RTC, provided by Loctite.

Claim 35 introduces an intended use limitation to the invention of claim 32. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

In the instant case, the intended use of *using oxygen as an oxidant* does not result in a structural difference between the claimed invention and the prior art. The claimed fuel cell is capable of performing the intended use; therefore, it meets the claimed limitations.



***New Claim Rejections - 35 USC § 103***

12. Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woods (US Pat. No. 6,656,580) and Technical Data Sheets for Resinol 90C and Resinol RTC, provided by Loctite.

Regarding claims 19-21, Woods does not explicitly disclose the process of claim 14, wherein **(19)** the primary product *maintains* a bulk density in a range of from 0.1 to 1.8 g/cm<sup>3</sup> (see column 4, lines 57-61; column 5, lines 36-44); wherein **(20)** the primary product *maintains* a bulk density in a range of from 0.3 to 1.5 g/cm<sup>3</sup> (see column 4, lines 57-61; column 5, lines 36-44); and wherein **(21)** the primary product *maintains* a bulk density in a range of from 0.5 to 1.3 g/cm<sup>3</sup> (see column 4, lines 57-61; column 5, lines 36-44). Rather, Woods discloses, "For example, a graphite sheet with a graphite density of about 0.08 to about 0.5 g/cc may be mechanically deformed resulting in a compressed sheet or plate with a graphite density greater than 1.0 g/cc," (column 5, lines 36-44). Woods does not provide any examples satisfying this limitation; however, the claimed ranges overlap the open-ended range set forth in Woods. In light of this, it has been found that in the case where claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists – *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976).

Therefore, the maintained density ranges of claims 19-21 would have been obvious because the initial range of Woods, 0.08 to about 0.5 g/cc, falls within the claimed range, and the final range of Woods, greater than 1.0 g/cc, overlaps the claimed range.

*New Claim Rejections - 35 USC § 102/103*

13. Claims 11, 12, and 34 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Woods (US Pat. No. 6,656,580) and Technical Data Sheets for Resinol 90C and Resinol RTC, provided by Loctite.

Regarding claim 11, Woods discloses the synthetic resin-impregnated body according to claim 1, wherein (*11*) it includes at least two independently held together networks, one of said networks being formed of a connected framework made of expanded or expanded and thereafter at least partially recompressed graphite with electrical and thermal conductivity, and the other of said networks being a connected network made of synthetic material having penetrated into said pore system (column 4, line 50 through column 5, line 5; column 5, lines 20-35); however, he does not explicitly disclose an electrical volume resistance from 0.10 to 0.77 mΩ.

Due to the conductive nature of the graphite materials, it appears that this volume resistance would have been an inherent property of Woods' invention. The resin-impregnated body of Woods contains the same materials as the instant invention. In light of this, it has been found that, "Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present – *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

Therefore the product of Woods would have inherently had a volume resistance of from 0.10 to 0.77 mΩ because the materials used are the same as those used in the instant invention.

Regarding claim 12, Woods discloses the synthetic resin-impregnated body according claim 1, (12) including a surface, regions close to said surface, and a remaining part (column 6, lines 12-22 and 50-59); however, he does not explicitly disclose that the resin system is disposed only in one of said remaining part and said regions.

The impregnation method of the instant invention is indistinguishable from the impregnation method used by Woods. In addition, Wood provides an optional step of removing excess resin (column 6, lines 50-59), which would have inherently removed resin from the surface and those areas *close to the surface*.

Therefore, the limitation of claim 12 would have been inherently satisfied by Woods because their impregnation step is accompanied by the removal of excess liquid, which inherently removes resin from the surface and those areas close to the surface.

Regarding claim 34, Woods does not explicitly disclose a gas permeability of from 0.001 to 0.016 mg/m<sup>2</sup>\*s; however, this gas permeability would have been an inherent property of Woods' invention. The resin-impregnated body of Woods contains the same materials as the instant invention. In light of this, it has been found that, "Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present – *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

Therefore the product of Woods would have inherently had a gas permeability of from 0.001 to 0.016 mg/m<sup>2</sup>\*s because the materials used are the same as those used in the instant invention.

*New Claim Objections*

14. Claim 17 is objected to because of the following informalities: "for percent" should be replaced with --four percent--. Appropriate correction is required.

*Allowable Subject Matter*

15. Claims 10, 18, and 30 are allowed.

16. Claim 17 would be allowable if rewritten or amended to overcome the objection(s), set forth in this Office action.

17. The following is a statement of reasons for the indication of allowable subject matter: claims 10, 17, 18, and 30 are allowable for the reasons set forth in the previous Office action:

- Regarding claims 10 and 30, Woods provides no motivation to include fillers in the porous graphite sheet.
- Regarding claims 17 and 18, Woods is silent regarding the ash value of porous graphite, and the prior art fails to shed light on the ash value of these materials.

*Response to Arguments*

18. Applicant's arguments filed July 15, 2004 have been fully considered but they are not persuasive.

- Claims 1-6 (*see pages 20-21*): Applicant argues that the claims of Woods contradict the disclosure of Woods. Pointing to Woods' example 2, the argument focuses on the sheet graphite density used by Woods and whether or not it would be capable of achieving the impregnation degree set forth in Wood's claim 17.

Firstly, it should be noted that disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred

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embodiments, and a patent is relevant for all it contains – *In re Sushi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971) and *In re Heck*, 699 F.2d 1331, 1332-33, 216 USPQ 1038, 1039 (Fed. Cir. 1983).

Secondly, it is unclear how the content of these arguments relates to the claimed subject matter (*claims 1-6*) of the instant invention.

- Claim 11 (*see page 21*): Applicant argues that Woods does not quantify electrical conductivity; however, this property would have been inherent because the materials used by Woods are the same as those used in the instant invention.
- Claim 13 (*see pages 21-22*): Applicant argues that Woods' use of the word "sealant" connotes a continuous surface. However, Woods explicitly discloses an impregnation step. Furthermore, the excess resin is removed from the surface of the resin-impregnated body (column 6, lines 50-59).
- Claims 31-33 (*see page 22*): Applicant provides no argument.
- Claim 35 (*see pages 22-23*): Applicant argues that Resinol® products are not recommended for use in pure oxygen and/or oxygen rich systems and accordingly they are not suitable for a fuel cell *using oxygen at an oxidant*. Although Resinol® products are not recommended for this intended use, they are *capable* for this intended use.
- Claim 34 (*see page 23*): Applicant argues that because Woods does not explicitly disclose an oxygen permeability value, the claim is novel over the prior art. However, this property would have been inherent because the materials used by Woods are the same as those used in the instant invention.

- Claims 14-16 and 19-24 (*see pages 23-28*): Applicant argues that the impregnated sheet taught by Woods is distinct from the instant invention because the processes used to make these sheets are different (*see pages 23-24*). Because of this, Applicant argues that the sheet of Woods is not capable of achieving certain degrees of impregnation. The crux of the argument is that Woods compresses after impregnation, and this sequence results in a density outside the limitations of the claimed invention.

However, Applicant has inaccurately summarized the method of Woods. Woods starts off with a “flexible graphite sheet”, which is, “an article of manufacture formed from *compression* of exfoliated graphite particles *without* a resin,” (column 4, lines 37-40), and wherein, “the compression operation flattens the *expanded* graphite particles causing them to somewhat engage and interlock,” (column 1, lines 54-56). This flexible graphite sheet has a density range of 0.08 to 1.4 g/cc (column 4, lines 50 through column 5, line 5). Next, the flexible graphite sheet is impregnated with resin (column 5, lines 6-30), followed by curing. Hence the method of Woods comprises: 1) compression of expanded graphite → 2) impregnation of the compressed, expanded graphite → 3) curing. The impregnated sheet can then be mechanically processed to form a graphite plate, wherein the final density is increased to values greater than 1.0 g/cc (column 5, lines 30-44). This process, with or without this optional step, satisfies the limitations of claims 14-16 and 19-24.

Furthermore, Applicant argues that not all of the density ranges of Woods satisfy the claimed ranges and/or are preferred. It should be noted that disclosed examples and preferred embodiments do not constitute a teaching away from a broader

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disclosure or nonpreferred embodiments, and a patent is relevant for all it contains –

*In re Sushi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971) and *In re Heck*, 699 F.2d 1331, 1332-33, 216 USPQ 1038, 1039 (Fed. Cir. 1983).

- Claims 7-9 and 25-29 (*see pages 28-29*): Applicant argues that motivation for these ranges does not exist because Woods calls for a high void fill (> 70%). However, the up-take quantity in Woods is not specifically limited to this range (column 6, lines 33-36). Furthermore, Applicant has failed to show criticality for these ranges.

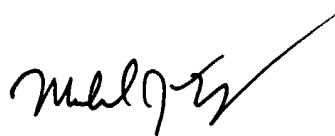
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***Communication***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Feely whose telephone number is 571-272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Michael J. Feely  
Patent Examiner  
Art Unit 1712

October 4, 2004